1. Continue O&M & sampling as stated in report. 2. Submit next quarterly report by October 15, 2024.

ENSOLUM

July 11, 2024

New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Second Quarter 2024 – SVE System Update
Howell M#1
San Juan County, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NRM2022755502

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *Second Quarter 2024 – SVE System Update* report summarizing the soil vapor extraction (SVE) system performance at the Howell M#1 natural gas production well (Site), located in Unit N of Section 30, Township 30 North, Range 8 West, San Juan County, New Mexico (Figure 1). The SVE system was put into operation on June 6, 2023, to remediate subsurface soil impacts resulting from historical impacts discovered at the Site. This report summarizes Site activities performed in April, May, and June of 2024.

SVE SYSTEM SPECIFICATIONS

The SVE system at the Site consists of a 3-phase, 3.5 horsepower Atlantic Blower AB-500 regenerative blower capable of producing 230 cubic feet per minute (cfm) flow and 88 inches of water column (IWC) vacuum. The system is powered by a permanent power drop and is intended to run 24 hours per day. Six SVE wells, SVE01 through SVE06, are currently in operation and are shown on Figure 2.

SECOND QUARTER 2024 ACTIVITIES

The SVE system began operation on June 6, 2023. Based on the New Mexico Oil Conservation Division (NMOCD) Conditions of Approval (COAs), dated November 7, 2022, field data measurements were collected bi-weekly from the system during the second quarter of 2024 and included the following parameters: flow, vacuum, photoionization detector (PID) measurements of volatile organic compounds (VOCs) from each SVE well and the total system influent, and oxygen/carbon dioxide measurements via hand-held analyzers from each SVE well. Field notes taken during operations and maintenance (O&M) visits are presented in Appendix A.

Since startup, vacuum extraction has been performed on all Site SVE wells in order to induce flow in impacted soil zones. Between March 25, 2024, and June 27, 2024, the SVE system operated for 2,195.5 hours for a runtime efficiency of 97 percent (%). Appendix B presents photographs of the runtime meter for calculating the second quarter 2024 runtime efficiency. Table 1 presents the SVE system operational hours and calculated percentage runtime.

Based on the November 2022 COAs, vapor samples are required to be collected every other month during the second through fourth quarters of the first year of operation. A vapor sample was collected on May 14, 2024. Prior to collection, the vapor sample was field screened with a PID for organic vapor monitoring (OVM). The emission samples were collected directly into two 1-Liter Tedlar® bags and submitted to Eurofins Environment Testing (Eurofins) in Albuquerque, New Mexico for analysis of total volatile petroleum hydrocarbons (TVPH – also known as total petroleum hydrocarbons – gasoline range organics (TPH-GRO)) following United States Environmental Protection Agency (EPA) Method 8015D, VOCs following EPA Method 8260B, and fixed gas analysis of oxygen and carbon dioxide following Gas Processors Association (GPA) Method 2261. A summary of field measurements and analytical data collected at the Site are presented in Tables 2 and 3, respectively. The full laboratory analytical report is attached as Appendix C. Oxygen and Carbon dioxide levels over time are presented in Graphs 1 and 2, respectively.

Vapor sample data and measured stack flow rates are used to estimate total mass recovered and total emissions generated by the SVE system (Table 4). Based on these estimates, 31,094 pounds (15.5 tons) of TVPH have been removed by the system to date. Please note that an error was identified in the calculations for the March 2024 mass removal and emissions results that has been corrected.

DISCUSSION AND RECOMMENDATIONS

The SVE system continues to effectively remove hydrocarbon mass from the subsurface in the current configuration. Bi-weekly visits and bi-monthly (every other month) sampling events will continue to be performed by Ensolum and/or Hilcorp personnel to ensure the SVE system is operating within normal working ranges (i.e., temperature, pressure, and vacuum). Deviations from regular operations will be noted on field logs and included in the following quarterly report.

We appreciate the opportunity to provide this report to the NMOCD. If you should have any questions or comments regarding this report, please contact the undersigned.

Sincerely,

Ensolum, LLC

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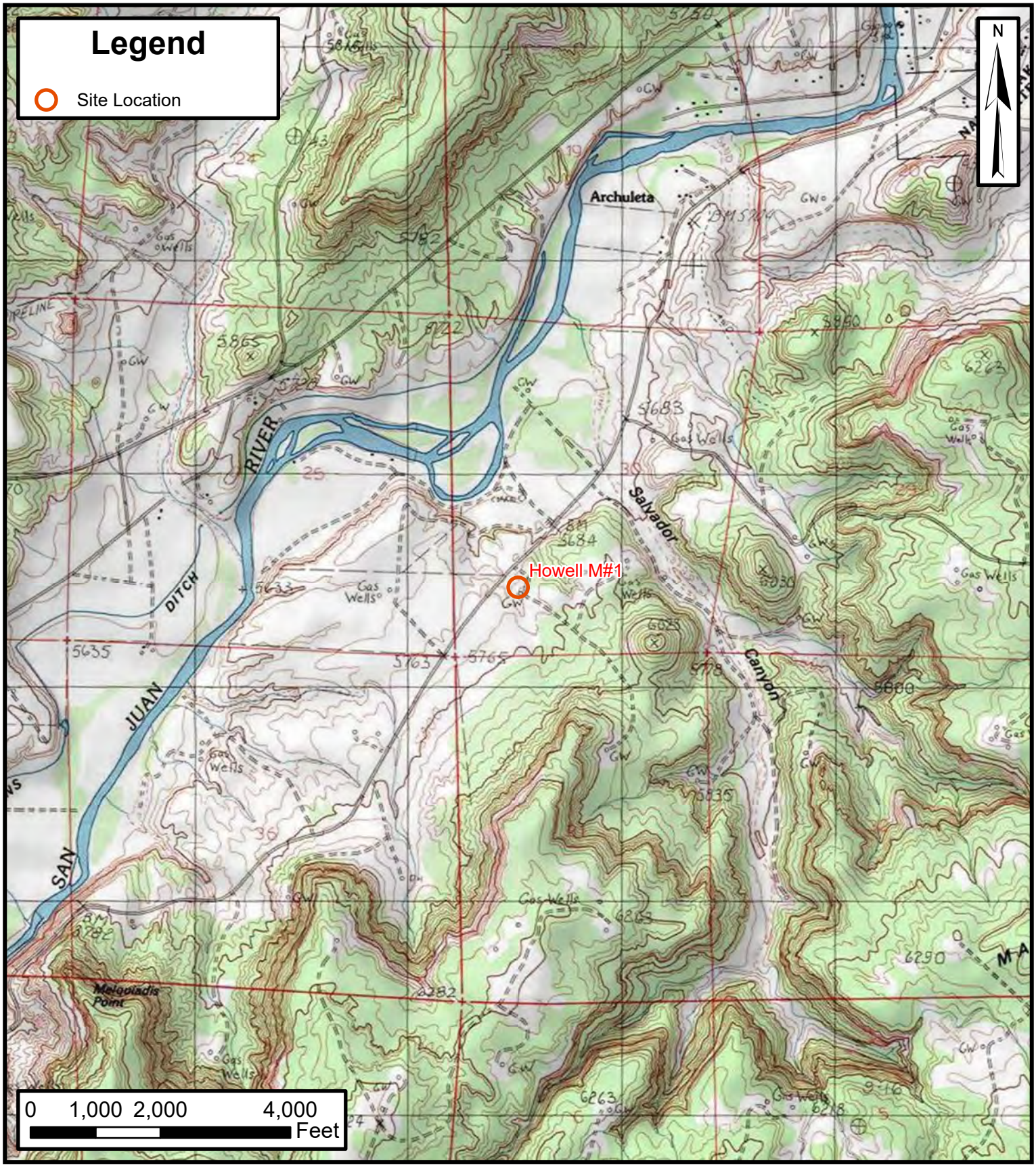
Attachments:

ENSOLUM

Figures



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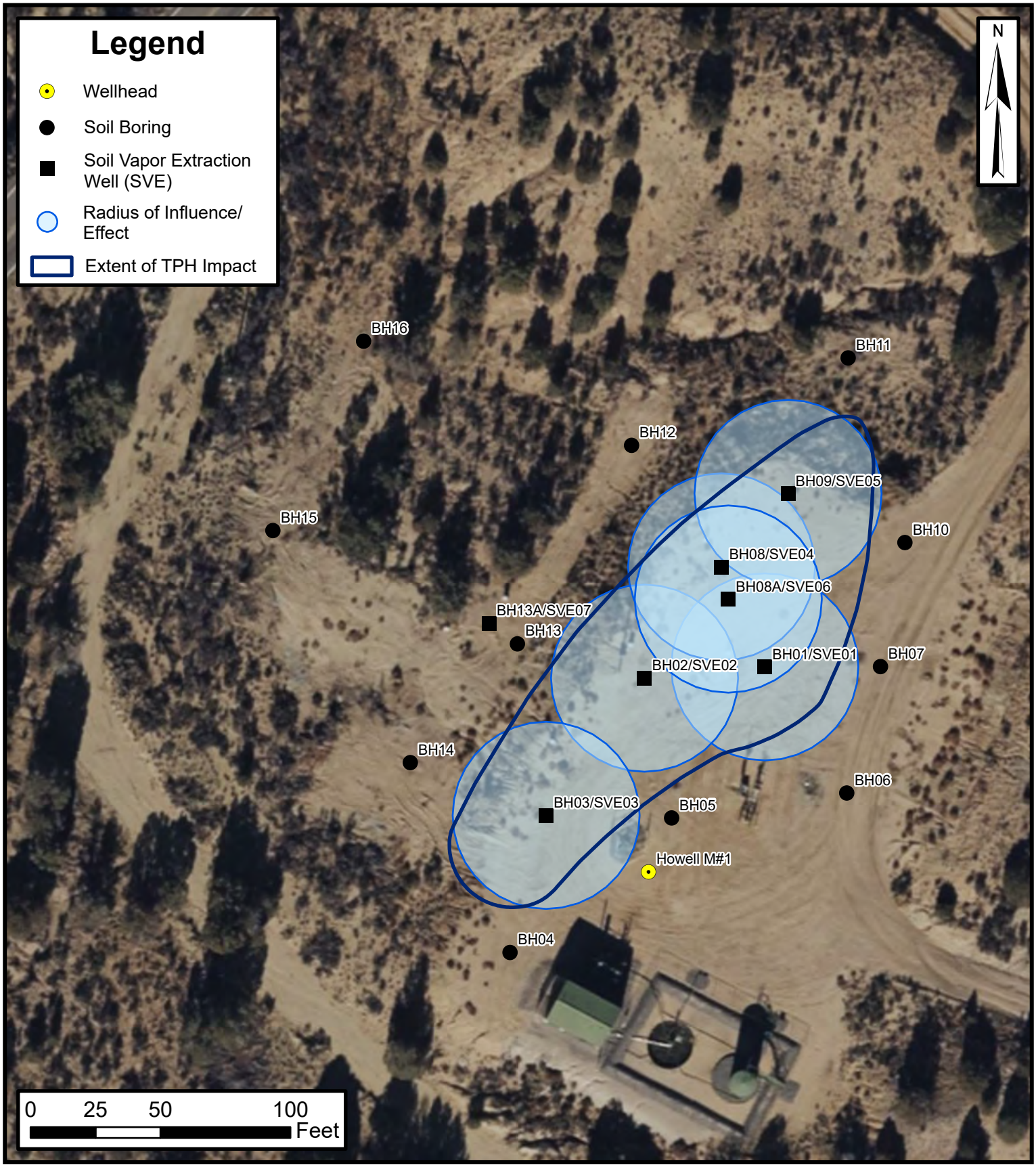
Environmental, Engineering and Hydrogeologic Consultants

Site Location Map

Howell M#1
Hilcorp Energy Company
36.777808, -107.717657
San Juan County, New Mexico

FIGURE
1

Sources: Environmental Systems Research Institute (ESRI), National Geographic Society, i-cubed



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RADIUS OF INFLUENCE AND EFFECT
HOWELL M #1
Howell M#1
Hilcorp Energy Company
36.777808, -107.717657
San Juan County, New Mexico

FIGURE
2

Sources: Environmental Systems Research Institute (ESRI), National Geographic Society, i-cubed

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Tables & Graphs

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TABLE 1
SOIL VAPOR EXTRACTION SYSTEM RUNTIME CALCULATIONS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

Date	Total Operational Hours	Delta Hours	Days	Quarterly Percent Runtime	Cumulative Percent Runtime
9/29/2023	2,687.4	Startup			
12/1/2023	4,145.0	1,457.6	63	96%	96%
3/25/2024	6,839.9	2,694.9	115	98%	97%
6/27/2024	9,035.4	2,195.5	94	97%	97%

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)
Influent, All Wells	6/6/2023	1,910	--	--	60	28	1.0	--	--
	6/7/2023	1,953	--	--	60	28	1.0	--	--
	6/13/2023	1,878	--	--	55	28	1.0	--	--
	6/22/2023	1,625	--	--	60	28	1.0	--	--
	6/29/2023	1,877	--	--	60	28	1.0	--	--
	7/13/2023	2,280	--	--	60	28	1.0	--	--
	7/27/2023	1,942	--	--	70	37	1.3	--	--
	8/9/2023	1,553	--	--	62	28	1.0	--	--
	8/24/2023	1,858	--	--	60	38	1.4	--	--
	9/8/2023	1,652	--	--	60	28	1.0	--	--
	9/21/2023	1,274	--	--	60	28	1.0	--	--
	10/30/2023	1,574	3.80	170	124	29	1.0	--	--
	11/2/2023	--	4.00	175	128	28	1.0	--	--
	12/1/2023	935	3.92	173	126	30	1.1	--	--
	12/19/2023	1,021	4.00	175	127	30	1.1	--	--
	1/9/2024	759	3.85	172	124	31	1.1	--	--
	1/23/2024	687	3.40	161	117	30	1.1	--	--
	1/29/2024	423	3.80	170	124	30	1.1	--	--
	2/6/2024	374	3.80	170	123	32	1.2	20.9	0.26
	2/22/2024	923	3.80	170	124	30	1.1	--	--
	3/6/2024	857	3.80	170	124	30	1.1	--	--
	3/25/2024	802	3.80	170	124	31	1.1	--	--
	4/8/2024	1,016	3.80	170	124	30	1.1	--	--
	4/17/2024	345	3.90	173	126	30	1.1	--	--
	5/14/2024	755	3.60	166	121	30	1.1	--	--
	5/23/2024	456	3.60	166	121	30	1.1	--	--
	6/4/2024	535	3.60	166	121	30	1.1	--	--
	6/27/2024	1,243	3.60	166	121	30	1.1	--	--
SVE01	6/6/2023	2,152	--	--	10.0	--	--	--	--
	6/7/2023	2,650	--	--	10.0	7.8	0.3	0.50	0.05
	6/13/2023	2,315	--	--	9.2	10	0.4	15.3	>5.0
	6/22/2023	1,953	--	--	10.0	9.6	0.3	19.6	3.99
	6/29/2023	1,935	--	--	10.0	9.9	0.4	21.4	1.52
	7/13/2023	1,515	--	--	10.0	--	--	21.9	0.64
	7/27/2023	2,265	--	--	11.7	9.6	0.3	21.1	1.48
	8/9/2023	1,384	--	--	10.3	10.1	0.4	21.9	0.92
	8/24/2023	541	--	--	10.00	10.3	0.4	22.4	0.02
	9/8/2023	1,333	--	--	10.0	--	--	20.9	0.56
	9/21/2023	1,015	--	--	10.0	9.3	0.3	20.9	0.64
	10/30/2023	589	--	--	21.3	29	--	20.9	0.06
	11/2/2023	--	--	--	--	28	1.0	--	--
	12/1/2023	416	0.00	0	0.0	30	1.1	20.9	0.01
	12/19/2023	186	0.19	38	27.7	30	1.1	19.5	0.12
	1/9/2024	486	0.02	12	9.0	31	1.1	20.9	0.11
	1/23/2024	244	0.05	20	14.2	30	1.1	20.9	0.02
	1/29/2024	509	0.04	17	13.3	12	0.4	20.9	0.38
	2/6/2024	529	0.00	0	0.0	12	0.4	20.9	0.08
	2/22/2024	306	0.00	0	0.0	12	0.4	20.9	0.04
	3/6/2024	314	0.01	9	6.7	12	0.4	20.9	0.04
	3/25/2024	632	0.01	9	6.7	12	0.5	20.8	0.10
	4/8/2024	603	0.01	9	6.7	12	0.4	20.9	0.04
	4/17/2024	257	0.01	9	6.7	12	0.4	20.8	0.03
	5/14/2024	336	0.00	0	0.0	11	0.4	20.7	0.06
	5/23/2024	155	0.00	0	0.0	11	0.4	20.6	0.02
	6/4/2024	271	0.00	0	0.0	11	0.4	20.9	0.05
	6/27/2024	173	0.00	0	0.0	11	0.4	20.9	0.03
SVE02	6/6/2023	2,201	--	--	10.0	--	--	--	--
	6/7/2023	2,216	--	--	10.0	8.3	0.3	3.30	0.05
	6/13/2023	2,243	--	--	9.2	9.4	0.3	20.9	2.22
	6/22/2023	1,820	--	--	10.0	8.8	0.3	21.7	0.90
	6/29/2023	2,395	--	--	10.0	8.8	0.3	21.7	0.84
	7/13/2023	264	--	--	10.0	--	--	22.5	0.02
	7/27/2023	2,205	--	--	11.7	9.1	0.3	22.9	0.54
	8/9/2023	1,520	--	--	10.3	9.3	0.3	22.4	0.42
	8/24/2023	146	--	--	10.0	9.5	0.3	22.4	0.04
	9/8/2023	1,086	--	--	10.0	--	--	20.9	0.14
	9/21/2023	1,189	--	--	10.0	8.8	0.3	20.9	0.24
	10/30/2023	404	--	--	20.7	29	1.0	20.9	0.09
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	1,302	0.23	42	30.5	30	1.1	20.9	0.15

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)
SVE02	12/19/2023	293	0.36	52	38.1	30	1.1	19.5	0.08
	1/9/2024	540	0.21	40	29.1	31	1.1	20.9	0.04
	1/23/2024	696	0.25	44	33.4	11	0.4	20.9	0.08
	1/29/2024	1,010	0.12	30	23.1	12	0.4	20.9	0.22
	2/6/2024	341	0.19	38	29.1	12	0.4	20.9	0.03
	2/22/2024	748	0.19	38	29.1	11	0.4	20.9	0.09
	3/6/2024	244	0.20	39	29.9	11	0.4	20.9	0.02
	3/25/2024	638	0.23	42	32.0	12	0.4	20.9	0.06
	4/8/2024	417	0.24	43	32.7	12	0.4	20.9	0.04
	4/17/2024	82	0.23	42	32.0	11	0.4	20.9	0.01
	5/14/2024	337	0.19	38	29.1	11	0.4	20.9	0.03
	5/22/2024	189	0.18	37	28.3	11	0.4	20.8	0.05
	6/4/2024	517	0.18	37	28.4	11	0.4	20.9	0.08
	6/27/2024	243	0.18	37	28.3	11	0.4	20.8	0.07
SVE03	6/6/2023	1,694	--	--	10.0	--	--	--	--
	6/7/2023	1,895	--	--	10.0	7.20	0.3	1.00	0.05
	6/13/2023	1,804	--	--	9.2	9.00	0.3	17.2	4.34
	6/22/2023	1,530	--	--	10.0	8.50	0.3	20.5	2.36
	6/29/2023	1,782	--	--	10.0	8.40	0.3	20.9	1.92
	7/13/2023	2,025	--	--	10.0	--	--	20.9	1.34
	7/27/2023	1,795	--	--	11.7	8.90	0.3	21.7	1.28
	8/9/2023	1,402	--	--	10.3	9.30	0.3	21.9	0.96
	8/24/2023	1,785	--	--	10.0	9.20	0.3	21.2	0.88
	9/8/2023	1,527	--	--	10.0	--	--	20.9	0.77
	9/21/2023	1,467	--	--	10.0	8.80	0.3	20.9	0.70
	10/30/2023	1,200	--	--	20.7	29	1.0	20.9	0.44
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	803	0.07	23	16.8	30	1.1	20.9	0.28
	12/19/2023	334	0.27	45	33.0	30	1.1	19.3	0.24
	1/9/2024	766	0.12	30	22.0	31	1.1	20.9	0.15
	1/23/2024	767	0.10	28	21.1	11	0.4	20.9	0.15
	1/29/2024	577	0.11	29	22.1	12	0.4	20.9	0.38
	2/6/2024	729	0.08	25	18.9	11	0.4	20.9	0.12
	2/22/2024	984	0.09	26	20.0	11	0.4	20.9	0.20
	3/6/2024	821	0.09	26	20.0	11	0.4	20.9	0.17
	3/25/2024	1,009	0.12	30	23.1	11	0.4	20.6	0.20
	4/8/2024	849	0.12	30	23.1	11	0.4	20.9	0.15
	4/17/2024	693	0.11	29	22.2	11	0.4	20.7	0.11
	5/14/2024	822	0.09	26	20.1	11	0.4	20.6	0.18
	5/23/2024	697	0.09	26	20.1	10	0.4	20.7	0.10
	6/4/2024	746	0.08	25	18.9	10	0.4	20.8	0.15
	6/27/2024	704	0.09	26	20.1	10	0.4	20.7	0.10
SVE04	6/6/2023	1,859	--	--	10.0	--	--	--	--
	6/7/2023	2,260	--	--	10.0	8.60	0.3	7.40	0.05
	6/13/2023	1,944	--	--	9.20	9.00	0.3	20.9	2.26
	6/22/2023	1,650	--	--	10.0	8.90	0.3	21.9	0.94
	6/29/2023	609	--	--	10.0	8.30	0.3	23.2	0.12
	7/13/2023	2,375	--	--	10.0	--	--	21.9	0.68
	7/27/2023	1,844	--	--	11.7	8.80	0.3	22.8	0.56
	8/9/2023	1,340	--	--	10.3	9.20	0.3	22.4	0.42
	8/24/2023	325	--	--	10.0	9.30	0.3	22.4	0.08
	9/8/2023	791	--	--	10.0	--	--	21.1	0.20
	9/21/2023	192	--	--	10.0	9.20	0.3	21.1	0.00
	10/30/2023	675	--	--	20.7	29	1.0	20.9	0.12
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	803	0.51	62	45.4	30	1.1	20.9	0.12
	12/19/2023	249	0.63	69	50.5	30	1.1	19.5	0.14
	1/9/2024	716	0.18	37	26.9	31	1.1	20.9	0.08
	1/23/2024	721	0.53	64	48.6	11	0.4	20.9	0.08
	1/29/2024	943	0.66	71	54.0	13	0.5	20.9	0.24
	2/6/2024	644	0.51	62	47.6	11	0.4	20.9	0.06
	2/22/2024	902	0.09	26	20.0	11	0.4	20.9	0.11
	3/6/2024	637	0.52	63	48.2	11	0.4	20.9	0.07
	3/25/2024	810	0.54	64	49.0	11	0.4	20.9	0.09
	4/8/2024	865	0.53	64	48.6	11	0.4	20.9	0.09
	4/17/2024	716	0.53	64	48.7	11	0.4	20.7	0.10
	5/14/2024	757	0.46	59	45.4	10	0.4	20.8	0.12
	5/23/2024	751	0.48	61	46.3	10	0.4	20.3	0.12
	6/4/2024	574	0.48	61	46.4	10	0.4	20.9	0.12

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)
SVE04	6/27/2024	622	0.40	55	42.3	10	0.4	20.8	0.11
SVE05	6/6/2023	1,922	--	--	10.0	--	--	--	--
	6/7/2023	2,110	--	--	10.0	10.0	0.4	16.8	0.05
	6/13/2023	1,265	--	--	9.20	10.2	0.4	22.4	1.96
	6/22/2023	950	--	--	10.0	9.70	0.4	22.8	0.90
	6/29/2023	1,043	--	--	10.0	9.40	0.3	22.8	0.72
	7/13/2023	1,205	--	--	10.0	--	--	22.5	0.58
	7/27/2023	875	--	--	11.7	9.80	0.4	23.4	0.42
	8/9/2023	795	--	--	10.3	10.0	0.4	22.5	0.38
	8/24/2023	475	--	--	10.0	10.5	0.4	22.5	0.28
	9/8/2023	398	--	--	10.0	--	--	20.9	0.28
	9/21/2023	219	--	--	10.0	10.2	0.4	21.2	0.06
	10/30/2023	404	--	--	20.7	29	1.0	20.9	0.14
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	387	0.14	33	23.8	30	1.1	20.9	0.09
	12/19/2023	327	0.23	42	30.5	30	1.1	19.5	0.08
	1/9/2024	361	0.18	37	26.9	31	1.1	20.9	0.05
	1/23/2024	355	0.16	35	26.7	12	0.4	20.9	0.10
	1/29/2024	471	0.18	37	28.2	12	0.4	20.9	0.24
	2/6/2024	300	0.13	32	24.0	12	0.4	20.9	0.07
	2/22/2024	362	0.16	35	26.7	12	0.4	20.9	0.10
	3/6/2024	381	0.18	37	28.3	12	0.4	20.9	0.07
	3/25/2024	598	0.15	34	25.8	12	0.4	20.9	0.09
	4/8/2024	631	0.14	33	24.9	12	0.4	20.9	0.09
	4/17/2024	344	0.15	34	25.8	12	0.4	20.8	0.10
	5/14/2024	321	0.12	30	23.1	12	0.4	20.9	0.08
	5/23/2024	369	0.12	30	23.1	12	0.4	20.8	0.06
	6/4/2024	392	0.13	32	24.0	12	0.4	20.9	0.09
	6/27/2024	419	0.10	28	21.1	11	0.4	20.8	0.07
SVE06	6/6/2023	1,713	--	--	10.0	--	--	--	--
	6/7/2023	1,701	--	--	10.0	9.20	0.3	0.80	0.05
	6/13/2023	1,262	--	--	9.20	10.4	0.4	12.1	>5.0
	6/22/2023	1,715	--	--	10.0	9.90	0.4	19.1	2.40
	6/29/2023	1,829	--	--	10.0	9.30	0.3	17.9	3.48
	7/13/2023	2,560	--	--	10.0	--	--	21.1	0.72
	7/27/2023	2,142	--	--	11.7	9.80	0.4	19.9	2.26
	8/9/2023	1,775	--	--	10.3	10.4	0.4	21.9	0.66
	8/24/2023	3,131	--	--	10.0	10.2	0.4	20.9	1.48
	9/8/2023	2,396	--	--	10.0	--	--	20.9	1.43
	9/21/2023	2,470	--	--	10.0	9.90	0.4	20.5	1.26
	10/30/2023	83	--	--	20.7	29	1.0	20.9	0.04
	11/2/2023	--	--	--	21.3	28	1.0	--	--
	12/1/2023	1,567	0.02	12	9.0	30	1.1	20.9	0.08
	12/19/2023	970	0.17	36	27.5	12	0.4	19.5	0.08
	1/9/2024	1,390	0.02	12	9.0	30	1.1	20.9	0.10
	1/23/2024	864	0.04	17	13.3	12	0.4	20.9	0.02
	1/29/2024	2,533	0.08	25	18.8	12	0.4	20.9	0.78
	2/6/2024	798	0.00	0	0.0	13	0.5	20.9	0.04
	2/22/2024	1,128	0.00	0	0.0	12	0.4	20.9	0.07
	3/6/2024	483	0.04	17	13.3	12	0.4	20.9	0.05
	3/25/2024	1,082	0.01	9	6.7	13	0.5	20.9	0.09
	4/8/2024	1,188	0.01	9	6.7	13	0.5	20.9	0.12
	4/17/2024	644	0.01	9	6.7	12	0.4	20.9	0.10
	5/14/2024	606	0.00	0	0.0	12	0.4	20.8	0.08
	5/23/2024	581	0.00	0	0.0	11	0.4	20.5	0.09
	6/4/2024	499	0.00	0	0.0	11	0.4	20.9	0.09
	6/27/2024	397	0.00	0	0.0	11	0.4	20.9	0.08

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TABLE 2
SOIL VAPOR EXTRACTION SYSTEM FIELD MEASUREMENTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

SVE Well ID	Date	PID (ppm)	Differential Pressure (IWC)	Flow Rate (acfm)	Flow Rate (scfm)[1][2][3]	Vacuum (IWC)	Vacuum (psi)	Oxygen (%)	Carbon Dioxide (%)

Notes:

(1): flow rates in scfm estimated based on total flow for total system rotometer field measurements collected between 6/6/2023 and 9/21/2023
(2): flow rates in scfm after 9/21/2023 are calculated based on total system pitot tube differential pressure measurements
(3): flow rates in scfm after 9/21/2023 based on an assumed temperature of 70F
IWC: inches of water column
PID: photoionization detector
ppm: parts per million
acfm: actual cubic feet per minute
scfm: standard cubic feet per minute
%: percent
--: not measured

ENSOLUM

TABLE 3
SOIL VAPOR EXTRACTION SYSTEM EMISSIONS ANALYTICAL RESULTS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH/GRO (µg/L)	Oxygen (%)	Carbon Dioxide (%)
6/6/2023	1,910	330	1,100	48	540	100,000	3.83%	10.23%
6/7/2023	1,953	190	730	31	320	93,000	8.07%	8.12%
6/13/2023	1,878	87	430	31	360	39,000	19.30%	2.47%
6/22/2023	1,625	42	200	12	120	26,000	20.33%	1.31%
6/29/2023	1,877	46	270	19	210	25,000	20.70%	0.98%
7/13/2023	2,280	51	360	28	320	25,000	21.38%	0.49%
7/27/2023	1,942	49	340	27	310	24,000	20.97%	0.72%
8/9/2023	1,553	34	230	16	180	17,000	21.35%	0.60%
8/24/2023	1,858	32	230	19	220	16,000	21.40%	0.55%
9/8/2023	1,652	23	250	25	290	18,000	21.48%	0.46%
9/21/2023	1,274	25	240	22	260	18,000	21.48%	0.48%
12/1/2023	935	13	160	11	120	9,400	21.43%	0.42%
1/9/2024	759	5.8	72	4.7	47	5,400	21.74%	0.31%
3/6/2024	857	<5.0	69	5.8	66	4,900 H	19.89%	0.25%
5/14/2024	755	2.1	84	8.2	93	6,000	21.60%	0.24%

Notes:

GRO: gasoline range organics

µg/L: microgram per liter

PID: photoionization detector

ppm: parts per million

TVPH: total volatile petroleum hydrocarbons

%: percent

Gray: less than laboratory reporting limit

H: sample analyzed outside of hold time

ENSOLUM

TABLE 4
SOIL VAPOR EXTRACTION SYSTEM MASS REMOVAL AND EMISSIONS
Howell M#1
Hilcorp Energy Company
San Juan County, New Mexico

Laboratory Analysis

Date	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
6/6/2023	1,910	330	1,100	48	540	100,000
6/7/2023	1,953	190	730	31	320	93,000
6/13/2023	1,878	87	430	31	360	39,000
6/22/2023	1,625	42	200	12	120	26,000
6/29/2023	1,877	46	270	19	210	25,000
7/13/2023	2,280	51	360	28	320	25,000
7/27/2023	1,942	49	340	27	310	24,000
8/9/2023	1,553	34	230	16	180	17,000
8/24/2023	1,858	32	230	19	220	16,000
9/8/2023	1,652	23	250	25	290	18,000
9/21/2023	1,274	25	240	22	260	18,000
12/1/2023	935	13	160	11	120	9,400
1/9/2024	759	5.8	72	4.7	47	5,400
3/6/2024 (1)	857	5.0	69	5.8	66	4,900
5/14/2024	755	2.1	84	8.2	93	6,000
Average	1,541	62	318	21	230	28,447

Vapor Extraction Summary

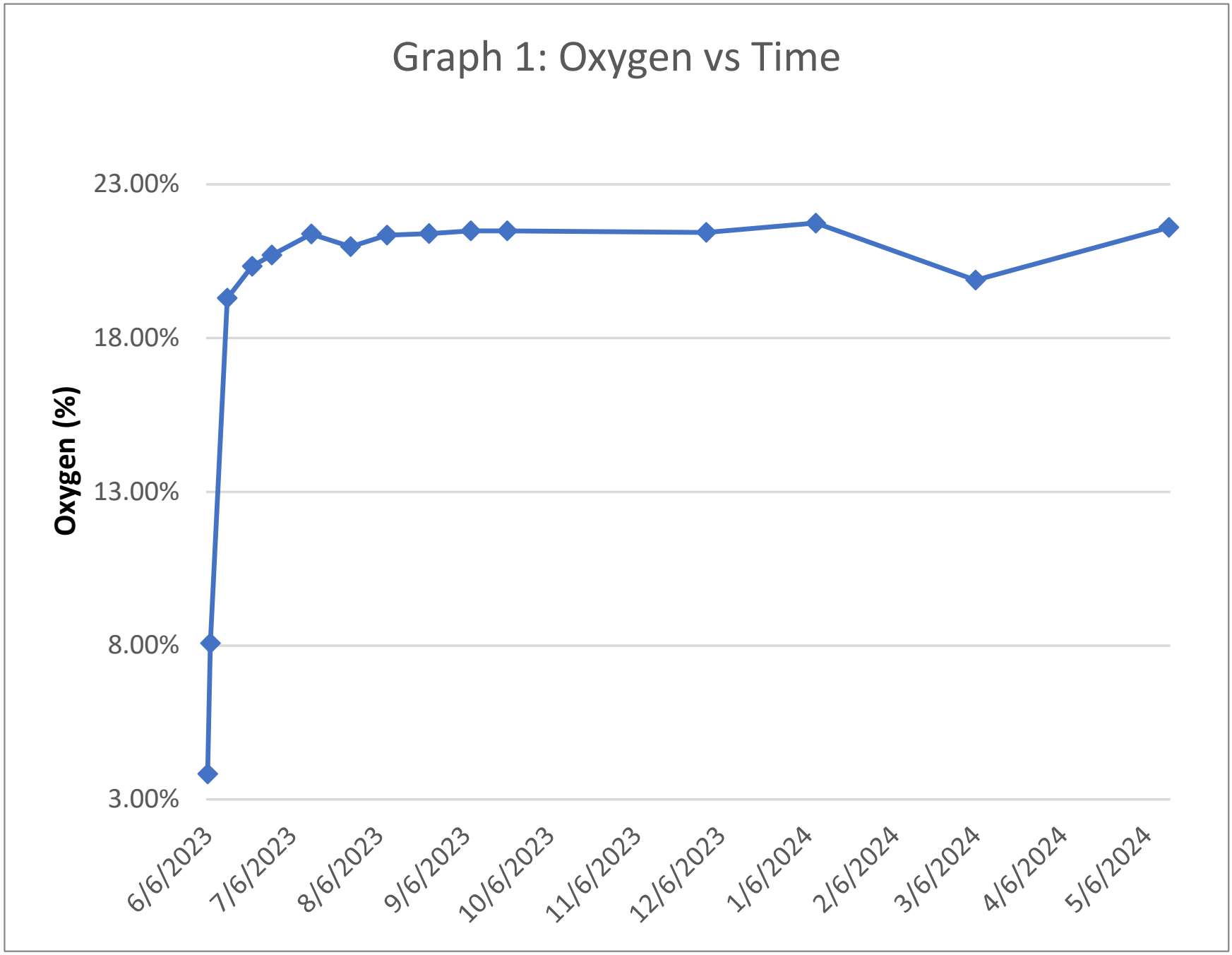
Date	Flow Rate (scfm)	Total System Flow (cf)	Delta Flow (cf)	Benzene (lb/hr)	Toluene (lb/hr)	Ethylbenzene (lb/hr)	Total Xylenes (lb/hr)	TVPH (lb/hr)
6/6/2023	--	System Startup						
6/7/2023	60	100,440	100,440	0.058	0.21	0.0089	0.096	22
6/13/2023	55	564,420	463,980	0.030	0.12	0.0067	0.073	14
6/23/2023	60	1,427,340	862,920	0.014	0.068	0.0046	0.052	7.0
6/29/2023	60	1,950,420	523,080	0.0099	0.053	0.0035	0.037	5.7
7/13/2023	60	3,166,860	1,216,440	0.011	0.071	0.0053	0.059	5.6
7/27/2023	70	4,566,300	1,399,440	0.012	0.085	0.0067	0.077	6.0
8/9/2023	62	5,735,124	1,168,824	0.010	0.070	0.0053	0.060	5.1
8/24/2023	60	7,034,364	1,299,240	0.0075	0.052	0.0040	0.046	3.8
9/8/2023	60	8,323,164	1,288,800	0.0062	0.054	0.0049	0.057	3.8
9/21/2023	60	9,455,364	1,132,200	0.0054	0.055	0.0053	0.062	4.0
12/1/2023	126	19,141,992	9,686,628	0.0066	0.070	0.0057	0.066	4.8
1/9/2024	124	25,704,072	6,562,080	0.0044	0.054	0.0037	0.039	3.5
3/6/2024	124	35,805,360	10,101,288	0.0025	0.033	0.0024	0.026	2.4
5/14/2024	121	47,793,072	11,987,712	0.0016	0.035	0.0032	0.036	2.5
			Average	0.013	0.074	0.0050	0.056	6.4

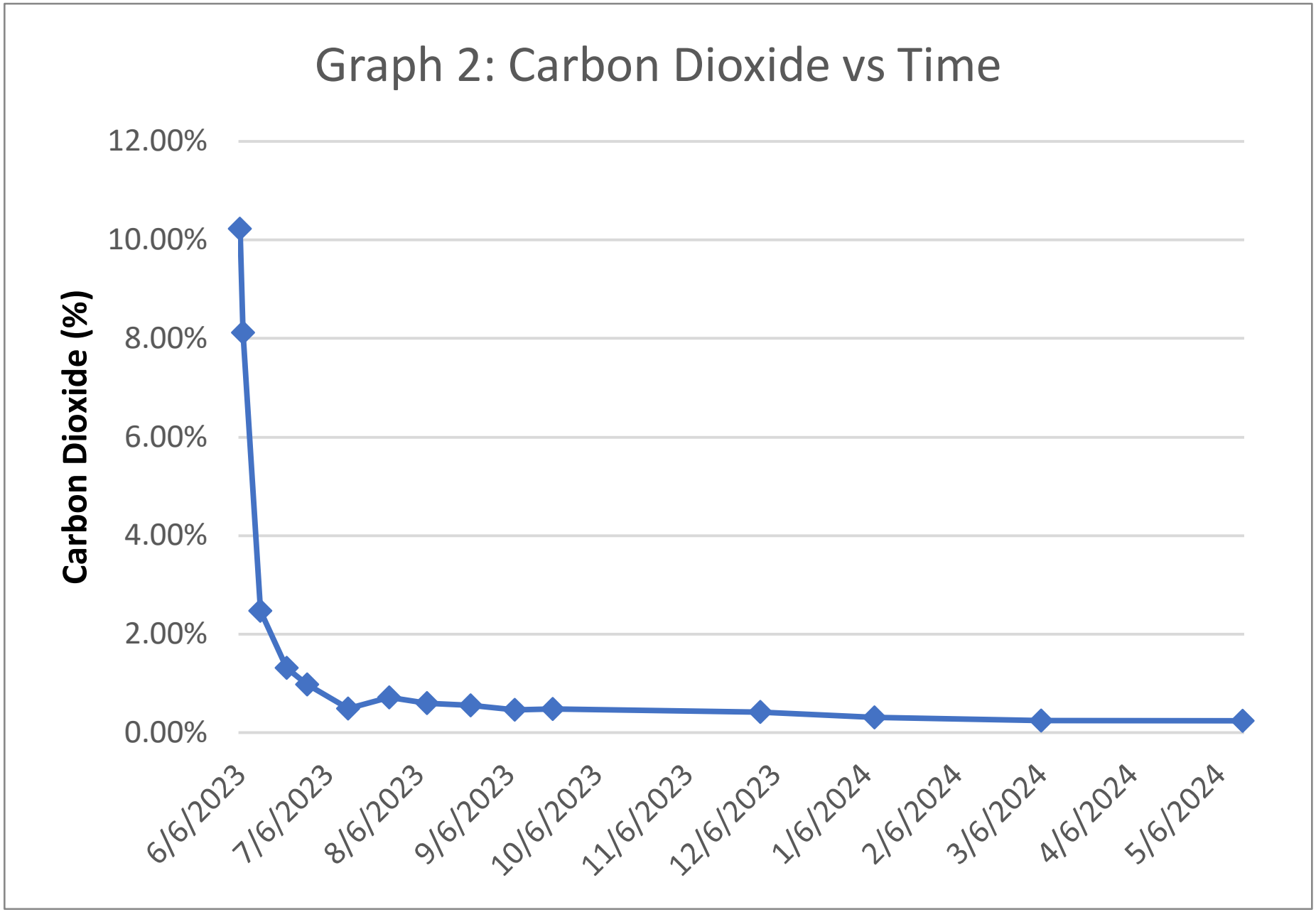
Mass Recovery

Date	Total Operational Hours	Delta Hours	Benzene (pounds)	Toluene (pounds)	Ethylbenzene (pounds)	Total Xylenes (pounds)	TVPH (pounds)	TVPH (tons)
6/6/2023	292	System Startup						
6/7/2023	319	28	1.6	5.7	0.25	2.7	604	0.30
6/13/2023	460	141	4.2	18	0.94	10	1,996	1.00
6/23/2023	700	240	3.3	16	1.1	12	1,675	0.84
6/29/2023	845	145	1.4	7.7	0.51	5.4	831	0.42
7/13/2023	1,183	338	3.7	24	1.8	20.1	1,896	0.95
7/27/2023	1,516	333	4.1	28	2.2	26	1,985	0.99
8/9/2023	1,830	314	3.2	22	1.7	19	1,590	0.79
8/24/2023	2,191	361	2.7	19	1.4	16	1,359	0.68
9/8/2023	2,549	358	2.2	19	1.8	20	1,366	0.68
9/21/2023	2,864	315	1.7	17	1.7	19	1,270	0.64
12/1/2023	4,145	1,281	8.5	89	7.4	85	6,106	3.05
1/9/2024	5,027	882	3.9	48	3.2	34	3,051	1.53
3/6/2024	6,385	1,358	3.4	44	3.3	36	3,243	1.62
5/14/2024	8,036	1,651	2.7	58	5.3	60	4,123	2.06
		Total Mass Recovery to Date	47	416	33	367	31,094	15.5

Notes:

(1) TVPH analyzed outside of hold time
cf: cubic feet
scfm: cubic feet per minute
µg/L: micrograms per liter
lb/hr: pounds per hour
PID: photoionization detector
ppm: parts per million
TVPH: total volatile petroleum hydrocarbons
--: not measured
gray: laboratory reporting limit used for calculating emissions





ENSOLUM

APPENDIX A

Field Notes

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 4-8
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	7174.8	1206
Inlet Vacuum (IWC)	30	
Differential Pressure	3.8	
Inlet PID	774.6	
Exhaust PID	1016	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)	8	

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	12.42	0.01	602.7	20.9	480
SVE02	11.73	0.24	416.7	20.9	440
SVE03	11.32	0.12	849.1	20.9	1540
SVE04	11.17	0.53	864.9	20.9	860
SVE05	12.01	0.14	630.8	20.9	900
SVE06	12.53	0.01	1188	20.9	1200

COMMENTS/OTHER MAINTENANCE:

scfm 70

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 4-17
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	7386.0	1330
Inlet Vacuum (IWC)	30	
Differential Pressure	3.9	
Inlet PID	345.3	
Exhaust PID	152.5	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	11.74	0.01	257.3	20.8	340
SVE02	11.07	0.23	87.1	20.9	80
SVE03	10.83	0.11	692.6	20.7	1080
SVE04	10.65	0.53	715.8	20.7	960
SVE05	11.73	0.15	343.8	20.8	900
SVE06	11.84	0.01	649.3	20.9	900

COMMENTS/OTHER MAINTENANCE:

scfm 65

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 5-14
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	8035.9	1423
Inlet Vacuum (IWC)	30	
Differential Pressure	3.6	
Inlet PID	754.6	
Exhaust PID	925.7	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING

SAMPLE ID: SVE-1 **SAMPLE TIME:** 1430
Analytes: Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM	OXYGEN (%)	CARBON DIOXIDE (%) ppm
SVE01	11.48	0.08	335.9	20.7	540
SVE02	10.83	0.19	337.2	20.9	340
SVE03	10.54	0.09	821.9	20.6	1760
SVE04	10.43	0.46	757.4	20.8	1160
SVE05	11.73	0.12	321.3	20.9	760
SVE06	11.61	0.00	605.5	20.8	760

COMMENTS/OTHER MAINTENANCE:

scfm 60

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 5-23 O&M PERSONNEL: B Sinclair
TIME ONSITE: TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	8253.4	1534
Inlet Vacuum (IWC)	30.0	
Differential Pressure	3.6	
Inlet PID	455.9	
Exhaust PID	800.9	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING

SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%) PPM
SVE01	11.32	0.00	154.5	20.6	180
SVE02	10.7	0.18	184.4	20.8	540
SVE03	10.34	0.09	697.4	20.7	960
SVE04	10.32	0.48	751.4	20.3	1240
SVE05	11.59	0.12	369.0	20.8	600
SVE06	11.49	0.00	581.3	20.5	940

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 6-4
TIME ONSITE:

O&M PERSONNEL: B Sinclair
TIME OFFSITE:

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours **(take photo)**	8541.4	1516
Inlet Vacuum (IWC)	30	
Differential Pressure	3.6	
Inlet PID	534.7	
Exhaust PID	846.2	
K/O Tank Liquid Level		
K/O Liquid Drained (gallons)		

SVE SYSTEM SAMPLING	
SAMPLE ID:	**SAMPLE TIME:**
Analytes:	Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS	

Change in Well Operation:

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	11.08	0	271.3	20.9	760
SVE02	10.52	0.18	517.4	20.9	800
SVE03	10.26	0.08	746.1	20.8	1520
SVE04	10.07	0.48	574	20.9	1200
SVE05	11.51	0.13	392.1	20.9	940
SVE06	11.24	0	499.4	20.9	860

COMMENTS/OTHER MAINTENANCE:

ENSOLUM

HOWELL M#1 SVE SYSTEM
O&M FORM

DATE: 6-27-24 O&M PERSONNEL: D. Burns
TIME ONSITE: 1130 TIME OFFSITE: 12:45

SVE SYSTEM - MONTHLY O&M

SVE ALARMS: KO TANK HIGH LEVEL

SVE SYSTEM	READING	TIME
Blower Hours (take photo)	9035.4	1200
Inlet Vacuum (IWC)	30	
Differential Pressure	3.6	IWC
Inlet PID		
Exhaust PID	1,243	ppm
K/O Tank Liquid Level	0	
K/O Liquid Drained (gallons)	NONE	

Inlet flow 60 scfm

Running @ 3,070 rpm
5.5 A
51.1 Hz

SVE SYSTEM SAMPLING

SAMPLE ID: No Samples SAMPLE TIME:
Analytes: Sample Bi-Monthly (every other month) for TVPH (8015), BTEX (8260), Fixed Gas (CO2 AND O2)
OPERATING WELLS: ALL

Change in Well Operation: Aj

WELLHEAD MEASUREMENTS

WELL ID	VACUUM (IWC)	DIFF PRESSURE (IWC)	PID HEADSPACE (PPM)	OXYGEN (%)	CARBON DIOXIDE (%)
SVE01	10.60	0	173.1	20.9	320
SVE02	10.85	0.16	242.9	20.8	730
SVE03	10.21	0.09	703.7	20.7	1,020
SVE04	10.24	0.40	621.6	20.8	1,140
SVE05	11.56	0.10	419.0	~~20.9~~ 20.8	720
SVE06	11.39	0	397.4	20.9	780

COMMENTS/OTHER MAINTENANCE:

- Replace inlet air filter
  - v. dusty + rusted/oxidized
- check tubing

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APPENDIX B

Project Photographs

PROJECT PHOTOGRAPHS
Howell M#1
San Juan County, New Mexico
Hilcorp Energy Company

Photograph 1 Runtime meter taken on March 25, 2024 at 12:46 PM Hours = 6,839.9	
Photograph 2 Runtime meter taken on June 27, 2024 at 12:00 PM Hours = 9,035.4	

Ensolum, LLC | Environmental & Hydrogeologic Consultants
Durango, Colorado | info@ensolum.com

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APPENDIX C

Laboratory Analytical Reports

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Mitch Killough
Hilcorp Energy
PO BOX 4700
Farmington, New Mexico 87499

Generated 6/4/2024 8:33:23 AM

JOB DESCRIPTION

Howell M1

JOB NUMBER

885-4728-1

Eurofins Albuquerque
4901 Hawkins NE
Albuquerque NM 87109

See page two for job notes and contact information.

Eurofins Albuquerque

Job Notes

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing South Central, LLC Project Manager.

Authorization

Generated
6/4/2024 8:33:23 AM

Authorized for release by
Andy Freeman, Business Unit Manager
andy.freeman@et.eurofinsus.com
(505)345-3975

Client: Hilcorp Energy
Project/Site: Howell M1

Laboratory Job ID: 885-4728-1

Table of Contents

Definitions/Glossary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Hilcorp Energy
Project: Howell M1

Job ID: 885-4728-1

Job ID: 885-4728-1 Eurofins Albuquerque

Job Narrative
885-4728-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The sample was received on 5/17/2024 7:05 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 10.8°C.

Subcontract Work
Method Fixed Gases: This method was subcontracted to Energy Laboratories, Inc. The subcontract laboratory certification is different from that of the facility issuing the final report. The subcontract report is appended in its entirety.

Gasoline Range Organics
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Client Sample ID: SVE-1

Lab Sample ID: 885-4728-1

Date Collected: 05/14/24 14:30
Matrix: Air
Date Received: 05/17/24 07:05
Sample Container: Tedlar Bag 1L

Method: SW846 8015D - Nonhalogenated Organics using GC/MS -Modified (Gasoline Range Organics)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	**6000**	**H**	100		ug/L			05/28/24 15:06	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*110*		*52 - 172*		*05/28/24 15:06*	*20*

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		2.0		ug/L			05/28/24 15:06	20
1,1,1-Trichloroethane	ND		2.0		ug/L			05/28/24 15:06	20
1,1,2,2-Tetrachloroethane	ND		4.0		ug/L			05/28/24 15:06	20
1,1,2-Trichloroethane	ND		2.0		ug/L			05/28/24 15:06	20
1,1-Dichloroethane	ND		2.0		ug/L			05/28/24 15:06	20
1,1-Dichloroethene	ND		2.0		ug/L			05/28/24 15:06	20
1,1-Dichloropropene	ND		2.0		ug/L			05/28/24 15:06	20
1,2,3-Trichlorobenzene	ND		2.0		ug/L			05/28/24 15:06	20
1,2,3-Trichloropropane	ND		4.0		ug/L			05/28/24 15:06	20
1,2,4-Trichlorobenzene	ND		2.0		ug/L			05/28/24 15:06	20
1,2,4-Trimethylbenzene	**4.0**		2.0		ug/L			05/28/24 15:06	20
1,2-Dibromo-3-Chloropropane	ND		4.0		ug/L			05/28/24 15:06	20
1,2-Dibromoethane (EDB)	ND		2.0		ug/L			05/28/24 15:06	20
1,2-Dichlorobenzene	ND		2.0		ug/L			05/28/24 15:06	20
1,2-Dichloroethane (EDC)	ND		2.0		ug/L			05/28/24 15:06	20
1,2-Dichloropropane	ND		2.0		ug/L			05/28/24 15:06	20
1,3,5-Trimethylbenzene	**4.9**		2.0		ug/L			05/28/24 15:06	20
1,3-Dichlorobenzene	ND		2.0		ug/L			05/28/24 15:06	20
1,3-Dichloropropane	ND		2.0		ug/L			05/28/24 15:06	20
1,4-Dichlorobenzene	ND		2.0		ug/L			05/28/24 15:06	20
1-Methylnaphthalene	ND		8.0		ug/L			05/28/24 15:06	20
2,2-Dichloropropane	ND		4.0		ug/L			05/28/24 15:06	20
2-Butanone	ND		20		ug/L			05/28/24 15:06	20
2-Chlorotoluene	ND		2.0		ug/L			05/28/24 15:06	20
2-Hexanone	ND		20		ug/L			05/28/24 15:06	20
2-Methylnaphthalene	ND		8.0		ug/L			05/28/24 15:06	20
4-Chlorotoluene	ND		2.0		ug/L			05/28/24 15:06	20
4-Isopropyltoluene	ND		2.0		ug/L			05/28/24 15:06	20
4-Methyl-2-pentanone	ND		20		ug/L			05/28/24 15:06	20
Acetone	ND		20		ug/L			05/28/24 15:06	20
Benzene	**2.1**		2.0		ug/L			05/28/24 15:06	20
Bromobenzene	ND		2.0		ug/L			05/28/24 15:06	20
Bromodichloromethane	ND		2.0		ug/L			05/28/24 15:06	20
Dibromochloromethane	ND		2.0		ug/L			05/28/24 15:06	20
Bromoform	ND		2.0		ug/L			05/28/24 15:06	20
Bromomethane	ND		6.0		ug/L			05/28/24 15:06	20
Carbon disulfide	ND		20		ug/L			05/28/24 15:06	20
Carbon tetrachloride	ND		2.0		ug/L			05/28/24 15:06	20
Chlorobenzene	ND		2.0		ug/L			05/28/24 15:06	20
Chloroethane	ND		4.0		ug/L			05/28/24 15:06	20
Chloroform	ND		2.0		ug/L			05/28/24 15:06	20

Client Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Client Sample ID: SVE-1

Lab Sample ID: 885-4728-1

Date Collected: 05/14/24 14:30
Matrix: Air
Date Received: 05/17/24 07:05
Sample Container: Tedlar Bag 1L

Method: SW846 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		6.0		ug/L			05/28/24 15:06	20
cis-1,2-Dichloroethene	ND		2.0		ug/L			05/28/24 15:06	20
cis-1,3-Dichloropropene	ND		2.0		ug/L			05/28/24 15:06	20
Dibromomethane	ND		2.0		ug/L			05/28/24 15:06	20
Dichlorodifluoromethane	ND		2.0		ug/L			05/28/24 15:06	20
Ethylbenzene	**8.2**		2.0		ug/L			05/28/24 15:06	20
Hexachlorobutadiene	ND		2.0		ug/L			05/28/24 15:06	20
Isopropylbenzene	ND		2.0		ug/L			05/28/24 15:06	20
Methyl-tert-butyl Ether (MTBE)	ND		2.0		ug/L			05/28/24 15:06	20
Methylene Chloride	ND		6.0		ug/L			05/28/24 15:06	20
n-Butylbenzene	ND		6.0		ug/L			05/28/24 15:06	20
N-Propylbenzene	ND		2.0		ug/L			05/28/24 15:06	20
Naphthalene	ND		4.0		ug/L			05/28/24 15:06	20
sec-Butylbenzene	ND		2.0		ug/L			05/28/24 15:06	20
Styrene	ND		2.0		ug/L			05/28/24 15:06	20
tert-Butylbenzene	ND		2.0		ug/L			05/28/24 15:06	20
Tetrachloroethene (PCE)	ND		2.0		ug/L			05/28/24 15:06	20
Toluene	**84**		2.0		ug/L			05/28/24 15:06	20
trans-1,2-Dichloroethene	ND		2.0		ug/L			05/28/24 15:06	20
trans-1,3-Dichloropropene	ND		2.0		ug/L			05/28/24 15:06	20
Trichloroethene (TCE)	ND		2.0		ug/L			05/28/24 15:06	20
Trichlorofluoromethane	ND		2.0		ug/L			05/28/24 15:06	20
Vinyl chloride	ND		2.0		ug/L			05/28/24 15:06	20
Xylenes, Total	**93**		3.0		ug/L			05/28/24 15:06	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*70 - 130*		*05/28/24 15:06*	*20*
Toluene-d8 (Surr)	*125*		*70 - 130*		*05/28/24 15:06*	*20*
4-Bromofluorobenzene (Surr)	*120*		*70 - 130*		*05/28/24 15:06*	*20*
Dibromofluoromethane (Surr)	*84*		*70 - 130*		*05/28/24 15:06*	*20*

QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Method: 8015D - Nonhalogenated Organics using GC/MS -Modified (Gasoline Range Organics)

Lab Sample ID: MB 885-5784/3
Matrix: Air
Analysis Batch: 5784

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics [C6 - C10]	ND		5.0		ug/L			05/28/24 13:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*52 - 172*		*05/28/24 13:52*	*1*

Lab Sample ID: LCS 885-5784/2
Matrix: Air
Analysis Batch: 5784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Gasoline Range Organics [C6 - C10]			400	518		ug/L		129			

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*106*		*52 - 172*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 885-5786/3
Matrix: Air
Analysis Batch: 5786

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/28/24 13:52	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/28/24 13:52	1
1,1,2,2-Tetrachloroethane	ND		0.20		ug/L			05/28/24 13:52	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/28/24 13:52	1
1,1-Dichloroethane	ND		0.10		ug/L			05/28/24 13:52	1
1,1-Dichloroethene	ND		0.10		ug/L			05/28/24 13:52	1
1,1-Dichloropropene	ND		0.10		ug/L			05/28/24 13:52	1
1,2,3-Trichlorobenzene	ND		0.10		ug/L			05/28/24 13:52	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/28/24 13:52	1
1,2,4-Trichlorobenzene	ND		0.10		ug/L			05/28/24 13:52	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
1,2-Dibromo-3-Chloropropane	ND		0.20		ug/L			05/28/24 13:52	1
1,2-Dibromoethane (EDB)	ND		0.10		ug/L			05/28/24 13:52	1
1,2-Dichlorobenzene	ND		0.10		ug/L			05/28/24 13:52	1
1,2-Dichloroethane (EDC)	ND		0.10		ug/L			05/28/24 13:52	1
1,2-Dichloropropane	ND		0.10		ug/L			05/28/24 13:52	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
1,3-Dichlorobenzene	ND		0.10		ug/L			05/28/24 13:52	1
1,3-Dichloropropane	ND		0.10		ug/L			05/28/24 13:52	1
1,4-Dichlorobenzene	ND		0.10		ug/L			05/28/24 13:52	1
1-Methylnaphthalene	ND		0.40		ug/L			05/28/24 13:52	1
2,2-Dichloropropane	ND		0.20		ug/L			05/28/24 13:52	1
2-Butanone	ND		1.0		ug/L			05/28/24 13:52	1
2-Chlorotoluene	ND		0.10		ug/L			05/28/24 13:52	1
2-Hexanone	ND		1.0		ug/L			05/28/24 13:52	1

QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 885-5786/3
Matrix: Air
Analysis Batch: 5786

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		0.40		ug/L			05/28/24 13:52	1
4-Chlorotoluene	ND		0.10		ug/L			05/28/24 13:52	1
4-Isopropyltoluene	ND		0.10		ug/L			05/28/24 13:52	1
4-Methyl-2-pentanone	ND		1.0		ug/L			05/28/24 13:52	1
Acetone	ND		1.0		ug/L			05/28/24 13:52	1
Benzene	ND		0.10		ug/L			05/28/24 13:52	1
Bromobenzene	ND		0.10		ug/L			05/28/24 13:52	1
Bromodichloromethane	ND		0.10		ug/L			05/28/24 13:52	1
Dibromochloromethane	ND		0.10		ug/L			05/28/24 13:52	1
Bromoform	ND		0.10		ug/L			05/28/24 13:52	1
Bromomethane	ND		0.30		ug/L			05/28/24 13:52	1
Carbon disulfide	ND		1.0		ug/L			05/28/24 13:52	1
Carbon tetrachloride	ND		0.10		ug/L			05/28/24 13:52	1
Chlorobenzene	ND		0.10		ug/L			05/28/24 13:52	1
Chloroethane	ND		0.20		ug/L			05/28/24 13:52	1
Chloroform	ND		0.10		ug/L			05/28/24 13:52	1
Chloromethane	ND		0.30		ug/L			05/28/24 13:52	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/28/24 13:52	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/28/24 13:52	1
Dibromomethane	ND		0.10		ug/L			05/28/24 13:52	1
Dichlorodifluoromethane	ND		0.10		ug/L			05/28/24 13:52	1
Ethylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
Hexachlorobutadiene	ND		0.10		ug/L			05/28/24 13:52	1
Isopropylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
Methyl-tert-butyl Ether (MTBE)	ND		0.10		ug/L			05/28/24 13:52	1
Methylene Chloride	ND		0.30		ug/L			05/28/24 13:52	1
n-Butylbenzene	ND		0.30		ug/L			05/28/24 13:52	1
N-Propylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
Naphthalene	ND		0.20		ug/L			05/28/24 13:52	1
sec-Butylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
Styrene	ND		0.10		ug/L			05/28/24 13:52	1
tert-Butylbenzene	ND		0.10		ug/L			05/28/24 13:52	1
Tetrachloroethene (PCE)	ND		0.10		ug/L			05/28/24 13:52	1
Toluene	ND		0.10		ug/L			05/28/24 13:52	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/28/24 13:52	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/28/24 13:52	1
Trichloroethene (TCE)	ND		0.10		ug/L			05/28/24 13:52	1
Trichlorofluoromethane	ND		0.10		ug/L			05/28/24 13:52	1
Vinyl chloride	ND		0.10		ug/L			05/28/24 13:52	1
Xylenes, Total	ND		0.15		ug/L			05/28/24 13:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*		*05/28/24 13:52*	*1*
Toluene-d8 (Surr)	*97*		*70 - 130*		*05/28/24 13:52*	*1*
4-Bromofluorobenzene (Surr)	*108*		*70 - 130*		*05/28/24 13:52*	*1*
Dibromofluoromethane (Surr)	*91*		*70 - 130*		*05/28/24 13:52*	*1*

QC Sample Results

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 885-5786/2
Matrix: Air
Analysis Batch: 5786

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,1-Dichloroethene			20.1	17.2		ug/L		85			
Benzene			20.1	18.2		ug/L		91			
Chlorobenzene			20.1	20.1		ug/L		100			
Toluene			20.2	20.2		ug/L		100			
Trichloroethene (TCE)			20.2	17.1		ug/L		85			

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 130*
Toluene-d8 (Surr)	*97*		*70 - 130*
4-Bromofluorobenzene (Surr)	*112*		*70 - 130*
Dibromofluoromethane (Surr)	*87*		*70 - 130*

QC Association Summary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

GC/MS VOA

Analysis Batch: 5784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-4728-1	SVE-1	Total/NA	Air	8015D	
MB 885-5784/3	Method Blank	Total/NA	Air	8015D	
LCS 885-5784/2	Lab Control Sample	Total/NA	Air	8015D	

Analysis Batch: 5786

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-4728-1	SVE-1	Total/NA	Air	8260B	
MB 885-5786/3	Method Blank	Total/NA	Air	8260B	
LCS 885-5786/2	Lab Control Sample	Total/NA	Air	8260B	

Lab Chronicle

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Client Sample ID: SVE-1

Date Collected: 05/14/24 14:30
Date Received: 05/17/24 07:05

Lab Sample ID: 885-4728-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8015D		20	5784	CM	EET ALB	05/28/24 15:06
Total/NA	Analysis	8260B		20	5786	CM	EET ALB	05/28/24 15:06

Laboratory References:

= , 1120 South 27th Street, Billings, MT 59101, TEL (406)252-6325

EET ALB = Eurofins Albuquerque, 4901 Hawkins NE, Albuquerque, NM 87109, TEL (505)345-3975

Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Laboratory: Eurofins Albuquerque

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New Mexico	State	NM9425, NM0901	02-26-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Air	Gasoline Range Organics [C6 - C10]
8260B		Air	1,1,1,2-Tetrachloroethane
8260B		Air	1,1,1-Trichloroethane
8260B		Air	1,1,2,2-Tetrachloroethane
8260B		Air	1,1,2-Trichloroethane
8260B		Air	1,1-Dichloroethane
8260B		Air	1,1-Dichloroethene
8260B		Air	1,1-Dichloropropene
8260B		Air	1,2,3-Trichlorobenzene
8260B		Air	1,2,3-Trichloropropane
8260B		Air	1,2,4-Trichlorobenzene
8260B		Air	1,2,4-Trimethylbenzene
8260B		Air	1,2-Dibromo-3-Chloropropane
8260B		Air	1,2-Dibromoethane (EDB)
8260B		Air	1,2-Dichlorobenzene
8260B		Air	1,2-Dichloroethane (EDC)
8260B		Air	1,2-Dichloropropane
8260B		Air	1,3,5-Trimethylbenzene
8260B		Air	1,3-Dichlorobenzene
8260B		Air	1,3-Dichloropropane
8260B		Air	1,4-Dichlorobenzene
8260B		Air	1-Methylnaphthalene
8260B		Air	2,2-Dichloropropane
8260B		Air	2-Butanone
8260B		Air	2-Chlorotoluene
8260B		Air	2-Hexanone
8260B		Air	2-Methylnaphthalene
8260B		Air	4-Chlorotoluene
8260B		Air	4-Isopropyltoluene
8260B		Air	4-Methyl-2-pentanone
8260B		Air	Acetone
8260B		Air	Benzene
8260B		Air	Bromobenzene
8260B		Air	Bromodichloromethane
8260B		Air	Bromoform
8260B		Air	Bromomethane
8260B		Air	Carbon disulfide
8260B		Air	Carbon tetrachloride
8260B		Air	Chlorobenzene
8260B		Air	Chloroethane
8260B		Air	Chloroform
8260B		Air	Chloromethane
8260B		Air	cis-1,2-Dichloroethene
8260B		Air	cis-1,3-Dichloropropene
8260B		Air	Dibromochloromethane

Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Laboratory: Eurofins Albuquerque (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260B		Air	Dibromomethane
8260B		Air	Dichlorodifluoromethane
8260B		Air	Ethylbenzene
8260B		Air	Hexachlorobutadiene
8260B		Air	Isopropylbenzene
8260B		Air	Methylene Chloride
8260B		Air	Methyl-tert-butyl Ether (MTBE)
8260B		Air	Naphthalene
8260B		Air	n-Butylbenzene
8260B		Air	N-Propylbenzene
8260B		Air	sec-Butylbenzene
8260B		Air	Styrene
8260B		Air	tert-Butylbenzene
8260B		Air	Tetrachloroethene (PCE)
8260B		Air	Toluene
8260B		Air	trans-1,2-Dichloroethene
8260B		Air	trans-1,3-Dichloropropene
8260B		Air	Trichloroethene (TCE)
8260B		Air	Trichlorofluoromethane
8260B		Air	Vinyl chloride
8260B		Air	Xylenes, Total

Oregon	NELAP	NM100001	02-26-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Air	Gasoline Range Organics [C6 - C10]
8260B		Air	1,1,1,2-Tetrachloroethane
8260B		Air	1,1,1-Trichloroethane
8260B		Air	1,1,2,2-Tetrachloroethane
8260B		Air	1,1,2-Trichloroethane
8260B		Air	1,1-Dichloroethane
8260B		Air	1,1-Dichloroethene
8260B		Air	1,1-Dichloropropene
8260B		Air	1,2,3-Trichlorobenzene
8260B		Air	1,2,3-Trichloropropane
8260B		Air	1,2,4-Trichlorobenzene
8260B		Air	1,2,4-Trimethylbenzene
8260B		Air	1,2-Dibromo-3-Chloropropane
8260B		Air	1,2-Dibromoethane (EDB)
8260B		Air	1,2-Dichlorobenzene
8260B		Air	1,2-Dichloroethane (EDC)
8260B		Air	1,2-Dichloropropane
8260B		Air	1,3,5-Trimethylbenzene
8260B		Air	1,3-Dichlorobenzene
8260B		Air	1,3-Dichloropropane
8260B		Air	1,4-Dichlorobenzene

Accreditation/Certification Summary

Client: Hilcorp Energy
Project/Site: Howell M1

Job ID: 885-4728-1

Laboratory: Eurofins Albuquerque (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260B		Air	1-Methylnaphthalene
8260B		Air	2,2-Dichloropropane
8260B		Air	2-Butanone
8260B		Air	2-Chlorotoluene
8260B		Air	2-Hexanone
8260B		Air	2-Methylnaphthalene
8260B		Air	4-Chlorotoluene
8260B		Air	4-Isopropyltoluene
8260B		Air	4-Methyl-2-pentanone
8260B		Air	Acetone
8260B		Air	Benzene
8260B		Air	Bromobenzene
8260B		Air	Bromodichloromethane
8260B		Air	Bromoform
8260B		Air	Bromomethane
8260B		Air	Carbon disulfide
8260B		Air	Carbon tetrachloride
8260B		Air	Chlorobenzene
8260B		Air	Chloroethane
8260B		Air	Chloroform
8260B		Air	Chloromethane
8260B		Air	cis-1,2-Dichloroethene
8260B		Air	cis-1,3-Dichloropropene
8260B		Air	Dibromochloromethane
8260B		Air	Dibromomethane
8260B		Air	Dichlorodifluoromethane
8260B		Air	Ethylbenzene
8260B		Air	Hexachlorobutadiene
8260B		Air	Isopropylbenzene
8260B		Air	Methylene Chloride
8260B		Air	Methyl-tert-butyl Ether (MTBE)
8260B		Air	Naphthalene
8260B		Air	n-Butylbenzene
8260B		Air	N-Propylbenzene
8260B		Air	sec-Butylbenzene
8260B		Air	Styrene
8260B		Air	tert-Butylbenzene
8260B		Air	Tetrachloroethene (PCE)
8260B		Air	Toluene
8260B		Air	trans-1,2-Dichloroethene
8260B		Air	trans-1,3-Dichloropropene
8260B		Air	Trichloroethene (TCE)
8260B		Air	Trichlorofluoromethane
8260B		Air	Vinyl chloride
8260B		Air	Xylenes, Total

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ANALYTICAL SUMMARY REPORT

June 03, 2024

Hall Environmental
4901 Hawkins St NE Ste D
Albuquerque, NM 87109-4372

Work Order: B24051995 Quote ID: B15626
Project Name: Howell M1, 88501698

Energy Laboratories Inc Billings MT received the following 1 sample for Hall Environmental on 5/22/2024 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B24051995-001	SVE-1 (885-4728-1)	05/14/24 14:30	05/22/24	Air	Air Correction Calculations Appearance and Comments Calculated Properties GPM @ std cond,/1000 cu. ft., moist. Free Natural Gas Analysis Specific Gravity @ 60/60

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

Energy Laboratories, Inc. verifies the reported results for the analysis has been technically reviewed and approved for release.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Hall Environmental
Project: Howell M1, 88501698
Lab ID: B24051995-001
Client Sample ID: SVE-1 (885-4728-1)

Report Date: 06/03/24
Collection Date: 05/14/24 14:30
DateReceived: 05/22/24
Matrix: Air

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
GAS CHROMATOGRAPHY ANALYSIS REPORT							
Oxygen	21.60	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Nitrogen	78.07	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Carbon Dioxide	0.24	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Hydrogen Sulfide	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Methane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Ethane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Propane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Isobutane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
n-Butane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Isopentane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
n-Pentane	<0.01	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Hexanes plus	0.09	Mol %		0.01		GPA 2261-95	05/29/24 10:54 / jrj
Propane	< 0.001	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
Isobutane	< 0.001	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
n-Butane	< 0.001	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
Isopentane	< 0.001	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
n-Pentane	< 0.001	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
Hexanes plus	0.038	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
GPM Total	0.038	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
GPM Pentanes plus	0.038	gpm		0.001		GPA 2261-95	05/29/24 10:54 / jrj
CALCULATED PROPERTIES							
Gross BTU per cu ft @ Std Cond. (HHV)	4			1		GPA 2261-95	05/29/24 10:54 / jrj
Net BTU per cu ft @ std cond. (LHV)	4			1		GPA 2261-95	05/29/24 10:54 / jrj
Pseudo-critical Pressure, psia	545			1		GPA 2261-95	05/29/24 10:54 / jrj
Pseudo-critical Temperature, deg R	240			1		GPA 2261-95	05/29/24 10:54 / jrj
Specific Gravity @ 60/60F	1.00			0.001		D3588-81	05/29/24 10:54 / jrj
Air, %	98.68			0.01		GPA 2261-95	05/29/24 10:54 / jrj
- The analysis was not corrected for air.							
COMMENTS							
-						-	05/29/24 10:54 / jrj

- BTU, GPM, and specific gravity are corrected for deviation from ideal gas behavior.
- GPM = gallons of liquid at standard conditions per 1000 cu. ft. of moisture free gas @ standard conditions.
- To convert BTU to a water-saturated basis @ standard conditions, multiply by 0.9825.
- Standard conditions: 60 F & 14.73 psi on a dry basis

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Hall Environmental **Work Order:** B24051995 **Report Date:** 06/03/24

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **GPA 2261-95**										Batch: R422006
Lab ID: **B24051995-001ADUP**	12	Sample Duplicate				Run: GCNGA-B_240529A				05/29/24 11:44
Oxygen		21.8	Mol %	0.01				0.7	20	
Nitrogen		77.9	Mol %	0.01				0.2	20	
Carbon Dioxide		0.24	Mol %	0.01				0.0	20	
Hydrogen Sulfide		<0.01	Mol %	0.01					20	
Methane		<0.01	Mol %	0.01					20	
Ethane		<0.01	Mol %	0.01					20	
Propane		<0.01	Mol %	0.01					20	
Isobutane		<0.01	Mol %	0.01					20	
n-Butane		<0.01	Mol %	0.01					20	
Isopentane		<0.01	Mol %	0.01					20	
n-Pentane		<0.01	Mol %	0.01					20	
Hexanes plus		0.09	Mol %	0.01				0.0	20	
Lab ID: **LCS052924**	11	Laboratory Control Sample				Run: GCNGA-B_240529A				05/29/24 02:35
Oxygen		0.62	Mol %	0.01	124	70	130			
Nitrogen		5.77	Mol %	0.01	96	70	130			
Carbon Dioxide		1.03	Mol %	0.01	104	70	130			
Methane		75.0	Mol %	0.01	100	70	130			
Ethane		6.04	Mol %	0.01	101	70	130			
Propane		5.04	Mol %	0.01	102	70	130			
Isobutane		1.63	Mol %	0.01	81	70	130			
n-Butane		2.01	Mol %	0.01	100	70	130			
Isopentane		1.01	Mol %	0.01	101	70	130			
n-Pentane		1.01	Mol %	0.01	101	70	130			
Hexanes plus		0.81	Mol %	0.01	101	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

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Work Order Receipt Checklist

Hall Environmental

B24051995

Login completed by: Crystal M. Jones
Date Received: 5/22/2024
Reviewed by: lleprowse
Received by: JFR
Reviewed Date: 5/28/2024
Carrier name: FedEx NDA

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☑	Not Applicable ☐
Container/Temp Blank temperature:	16.8°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

Contact and Corrective Action Comments:

None

Eurofins Albuquerque
4901 Hawkins NE
Albuquerque, NM 87109
Phone: 505-345-3975 Fax: 505-345-4107

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Freeman, Andy	Carrier Tracking No(s):	COC No: 885-714.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: andy.freeman@et.eurofinsus.com	State of Origin: New Mexico	Page: Page 1 of 1
Company: Energy Laboratories, Inc.		Accreditations Required (See note): NELAP - Oregon; State - New Mexico		Job #: 885-4728-1
Address: 1120 South 27th Street, ,	Due Date Requested: 5/30/2024	Analysis Requested		Preservation Codes: -
City: Billings	TAT Requested (days):			
State, Zip: MT, 59101				
Phone: 406-252-6325(Tel)	PO #:			
Email:	WO #:			Other:
Project Name: Howell M1	Project #: 88501698			
Site:	SSOW#:			

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Fixed Gases)/ Fixed Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
SVE-1 (885-4728-1)	5/14/24	14:30 Mountain		Air			X	1	B24051995

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 5/20/24 17:48	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 5/22/24 0730	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 04/02/2024

ICOC No:
885-714

Containers

Count	Container Type	Preservative
1	Tedlar Bag 1L	None

Chain-of-Custody Record

Client: Hilcorp

Mailing Address:

Phone #:

email or Fax#: brandon.sinclair@hilcorp.com

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Howell M 1

Project #:

Project Manager: Mitch Killough

Sampler: Brandon Sinclair

On Ice: ☐ Yes ☐ No

# of Coolers: 1 Yes

Cooler Temp(including CF): 10.6+0.2=10.8 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107
885-4728 COC

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No.	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	8015 TVPH	Fixed gas O_2&CO_2			
5-14	1430	air	SVE-1	2 Tedlar		1								✓			✓	✓			

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
5/16/24	1609				5/16/24	1609
5/16/24	1740			courier	5/17/24	7:05

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories This serves as notice of this possibility Any sub-contracted data will be clearly notated on the analytical report.

Login Sample Receipt Checklist

Client: Hilcorp Energy Job Number: 885-4728-1

Login Number: 4728 **List Source: Eurofins Albuquerque**
List Number: 1
Creator: Casarrubias, Tracy

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 363137

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 363137
	Action Type: [REPORT] Alternative Remediation Report (C-141AR)

CONDITIONS

Created By	Condition	Condition Date
nvelez	1. Continue O&M & sampling as stated in report. 2. Submit next quarterly report by October 15, 2024.	8/2/2024